



**Joshua Lederberg**

4-12-69

## Chromium, Other Elements Seen Crucial in Human Diets

MENDELEYEV'S periodic table of the natural elements is celebrating its 100th anniversary this year. This formulation of the variety of kinds of atomic elements was a crucial turning point in our orderly understanding of the makeup of the natural world. The physicists are bent on outdoing nature, and we will probably be hearing more and more about new elements artificially created by nuclear reactions.

Transcending the traditional table of 92 "natural" elements, from hydrogen to uranium, these new atoms will undoubtedly help to illuminate the fundamental laws of physical nature. A biologist cannot restrain a wry comment that we are very far from understanding the importance for life and for man of all the natural elements already around us.

Any, and, perhaps all, of

the elements may eventually prove to be crucially important in the human diet, either as nutrient or as toxin. Names like chromium, molybdenum, zirconium, manganese or vanadium are scarcely household words, but they are household items. We are constantly exposed to more or less of them in our diet, our water supply, or in urban atmospheres and we can hardly expect to be so fortunate that we will accidentally take in exactly the right balance needed for optimum

THE DANGER is that we may lose sight of their specificity, lumping the whole mess under the heading of minerals. Nutritional research is only now beginning to put them in some sensible order so that metal requirements and metal poisoning can be taken up one element at a time. There will still be many complexities, such as individual differences, like the pallid (mutant) mouse's need for high levels of manganese.

Dr. H. A. Schroeder of Brattleboro, Vt., and Dartmouth Medical School has been one of the leading investigators and reviewers of trace metal research. Some of his most provocative reports concern a dietary requirement for chromium, which appears to be a co-factor, with insulin, for the utilization of blood sugar.

There is little direct evidence of chromium deficiency in man. However, a few patients with diabetes have responded favorably to added chromium. Furthermore, the body content of chromium among white Americans is markedly lower than in other populations. This finding may be related to the removal of chromium from natural goods like sugar and wheat during refining.

CHROMIUM supplements also counteracted the effect of refined sugar in raising blood cholesterol levels in animals, which has interesting implications for dietary control of cardiovascular disease. This already makes a pretty good case for add-

ing back enough chromium to refined sugar to restore its natural level. However, this would be labeled "medication," while pure sugar is not, though sucrose has many interesting effects of its own on metabolism.

In an earlier study, Dr. Schroeder had reported life-shortening effects of adding enough lead to a rat's diet to bring its tissues to the same level that most people have from our urban environment. He later found that the rat's basic diet was already somewhat deficient in chromium (like most of ours). The same level of lead was harmless when enough chromium was added. This is to say that we redouble our hazards from lead pollution by being inattentive or ignorant about our needs for other trace metals.